



**PATENT APPLICATION**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of

Docket No: Q63523

Keiji ONO, et al.

Appln. No.: 09/810,225

Group Art Unit: 1762

Confirmation No.: 6895

Examiner: Elena Tsoy

Filed: March 19, 2001

For: PROCESS FOR PRODUCING LIGHT-EMITTING PHOSPHOR

**REPLY BRIEF PURSUANT TO 37 C.F.R. § 41.41**

**MAIL STOP APPEAL BRIEF - PATENTS**

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.41, Appellant respectfully submits this Reply Brief in response to the Examiner's Answer dated July 14, 2006. Entry of this Reply Brief is respectfully requested.

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**STATUS OF CLAIMS**

Claims 1, 3, 4 and 15 are before the Examiner and are rejected.

Claims 2 and 5 have been canceled.

Claims 6-14 are withdrawn from consideration.

This is an appeal from the Examiner's rejection of claims 1, 3, 4 and 15.

**GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

Claims 1, 3 and 15 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over US '124 and US '047 in view of each other.

Claims 1, 3-4 and 15 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kasenga et al (US '707) in view of Mizuta et al (US '654) and Bechtel et al (US '047).

**ARGUMENT**

In response to the Examiner's Answer, Appellants reiterate the differences between the present invention and the cited references.

**A. Sigai (US '124) and Bechtel et al. (US '047) in view of each other does not render the claimed invention obvious.**

Claims 1, 3 and 15 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over US '124 and US '047 in view of each other.

**(i) Examiner's Answer**

The Examiner maintains the position that one of ordinary skill in the art would use the method of US '124 to coat the aluminate phosphors of US '047 because US '047 teaches that the aluminate phosphors benefit from coatings that increase their lifetime, and US '124 teaches coatings that extend phosphor lifetimes of any material that is excitable by ultra-violet radiation.

The Examiner also maintains that Appellants' argument that the anhydrous catenapolyphosphate coating materials of US '047 do not react with the UV phosphors is not convincing because US '047 does not contain a statement of inoperability necessary to rise to the level of a teaching away.

**(ii) Appellants' Response**

**(a) Claim 15**

In response to the Examiner's Answer, Appellants reiterate that US '047 does not teach or suggest coatings that react with the aluminate phosphors. Therefore, contrary to the

Examiner's assertion, one of ordinary skill in the art would not have been motivated to modify or combine the teachings of US '124 and US '047.

US '124 teaches a method for improving lumen maintenance of fluorescent lamps comprising the steps of depositing a continuous aluminum oxide coating on individual particles of a finely-divided fluorescent lamp phosphor powder to form individually and continuously coated phosphor particles. Column 1, line 68 to column 2, line 5. The coating is obtained by reacting an aluminum containing precursor material deposited on the surface of phosphor powder particles to form aluminum oxide. Column 3, lines 42-46. Aluminum acetylacetonates are disclosed as examples of suitable precursors of the aluminum-containing compounds. Column 3, lines 47-49.

On the other hand, US '047 specifically teaches a coating material including catena-polyphosphates that do not react with the UV phosphors to achieve a coating that is not subject to degeneration when the UV-phosphor is excited by UV-radiation due to the inability of the catena-polyphosphates to react with the UV-phosphors. Col. 1, lines 33-37. Thus, the two references employ different types of coating materials.

Further, the different types of coating material are used for different purposes. US '124 provides a method for improving lumen maintenance of fluorescent lamps and an improved fluorescent lamp phosphor, which is an aluminum-containing precursor coated silicate phosphor, in order to solve the problems described above.

US '047 provides a phosphor composition of an UV-phosphor with a coating that is not subject to degeneration under UV-radiation. See column 1, lines 33-37. Additionally, it is disclosed that plasma display includes a noble gas or noble gas mixture, not mercury, as a discharge gas. See column 1, lines 10-11. Accordingly, a mercury compound is not formed as in the process of US '124. Therefore, the problem to be solved in US '047 is not the same as that of US '124. Thus, the two types of coating materials are employed for different purposes and one of ordinary skill in the art would not have been motivated to substitute one coating material for the other.

Additionally, US '047 teaches away from the use of coatings that react with the phosphor substrate. The object of US '047 is to provide a coating which is not subject to degeneration when the phosphor is excited by UV-radiation. Column 1, lines 35-37. This object is achieved by using anhydrous catena-polyphosphates which form a hard water insoluble coating on the phosphor particles and do not react with the UV-phosphors such that even when the catena-polyphosphates are exposed to radiation, they do not degrade like the aluminate phosphors. Column 1, lines 44-60. Therefore, US '047 teaches away from a coupling agent that would react with an aluminate phosphor as in US '124 and in the present invention. Therefore, it follows that, based on the teachings of the references, one of ordinary skill in the art would not have been motivated to modify or combine US '047 with US '124 and to employ a coupling agent comprising an aluminum compound as an aluminum oxide precursor to form an aluminum oxide coating on an aluminate phosphor, as provided for in present claim 15. Thus, the Examiner has not established a prima facie showing obviousness with respect to the claimed invention.

In the Examiner's Answer, the Examiner states that Appellants' argument that the anhydrous catena-polyphosphate coating materials of US '047 do not react with the UV phosphors is not convincing because US '047 does not contain a statement of inoperability necessary to rise to the level of "teaching away" from the claimed invention and because the present claims do not require a reaction with the substrate.

Appellants again respectfully disagree with the Examiner's statement indicating that there must be a statement of inoperability in the reference in order for the reference to be considered as teaching away from the claimed invention. This is not the law. The test for obviousness is what the combined teachings of the references would have suggested to those of ordinary skill in the art and the proper inquiry is whether the prior art as a whole suggests the desirability of the claimed invention. See MPEP § 2143.01(1) and (II). A disclosure which criticizes, discredits, or otherwise discourages the claimed invention may be a sufficient teaching away to establish nonobviousness of a claimed invention. See MPEP § 2143.01(I) quoting *In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed.Cir. 2004).

Further, Appellants submit that the prior art must be considered in its entirety, i.e., as a whole, including disclosure teaching away (leading away) from the claimed invention. See MPEP § 2142.02(VI) and *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). By specifically disclosing that the use of anhydrous catena-polyphosphate coating materials in particular is advantageous, US '047 teaches away from using another coating material such as is used in the present invention.

In applying these legal principles, Appellants submit that the Examiner has not met the initial burden of providing some suggestion of the desirability of combining or modifying the teachings in the prior art to arrive at the claimed invention. As the Examiner admits, US '124 does not teach or suggest the use of aluminate phosphors and US '047 does not teach or suggest aluminum oxide coatings. Further, as discussed above, there is no suggestion of the desirability in the prior art of employing a coupling agent comprising an aluminum compound to coat aluminate phosphors. The simple fact that US '047 teaches that aluminate phosphors benefit from coatings that increase their lifetime does not mean that one of ordinary skill in the art would have selected a coupling agent comprising an aluminum compound as the coating material as in present claim 15, particularly in view of the teaching away from compounds that react with UV-phosphors to achieve the desired effect of a coating that is not subject to degeneration when the UV-phosphor is excited by UV-radiation.

The test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art. Further, the Examiner must weigh the suggestive power of each reference. *In re Young*, 927 F.2d 588, 18 USPQ2d 1089 (Fed. Cir. 1991). In this regard, US '047 implies that a coating material that does not react with the UV-phosphors provides advantages over coating materials that do react with UV-phosphors such that one of ordinary skill in the art would not be motivated to employ a coating material that would react with the UV-phosphor with a reasonable expectation of achieving the effects and advantages taught by US '047.



In view of the above, Appellants maintain that US '124 and US '047, taken alone or in combination, do not teach or suggest mixing an aluminate phosphor with a coupling agent comprising an aluminum compound to form a coating that reacts with the aluminate phosphor as in the present invention and therefore the rejection as to claim 15 should be reversed.

**(b) Claims 1 and 3**

In the process of the present invention, a coupling agent comprising a compound having a 1, 3-diketone structure is used as a raw material for coating an aluminate phosphor. The coupling agent can be distributed uniformly without forming a precipitate of an aluminum compound since the hydrolysis speed thereof is extremely high. See page 6, lines 8-11 of the present specification.

According to the process of the invention, a vacuum ultraviolet ray-excited light-emitting phosphor having an excellent life property of maintaining light-emitting brilliance over time is obtained. See page 6, lines 16-18 and page 8, lines 21-25 of the present invention and Example 1.

For the reasons set forth above, which are incorporated herein, Appellants maintain that US '124 and US '047, taken alone or in combination, do not teach or suggest mixing an aluminate phosphor with a coupling agent comprising an aluminum compound to form a coating that reacts with the aluminate phosphor. Since the cited references do not even teach mixing an aluminate phosphor with a coupling agent comprising an aluminum compound, the references cannot be said to teach or suggest mixing an aluminate phosphor with the specific coupling agent

comprising an aluminum compound with a 1,3-diketone structure as in present claim 1. Claim 3 depends from claim 1 and is patentable for at least the same reasons. Therefore, the rejection as to claims 1 and 3 should be reversed.

**B. Kasenga et al. (US ‘707) in view of Mizuta et al. (US ‘654) and Bechtel et al. (US ‘047)**

Claims 1, 3-4 and 15 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kasenga et al. (US ‘707) in view of Mizuta et al. (US ‘654) and Bechtel et al. (US ‘047).

**(i) Examiner’s Answer**

The Examiner maintain the position that it would have been obvious to one of ordinary skill in the art to use the method of US ‘707 and US ‘654 to coat the aluminate phosphors of US ‘047 because US ‘047 teaches that the aluminate phosphors benefit from coatings that increase their lifetime and US ‘707 and US ‘654 teach coatings that extend phosphor lifetimes.

**(ii) Appellants’ Response**

**(a) Claim 15**

In response to the Examiner’s Answer, Appellants maintain that the present invention provides a process for producing a vacuum ultraviolet ray-excited light-emitting phosphor comprising the steps of mixing an aluminate phosphor compound with a coupling agent comprising an aluminum compound, and calcining the mixture as recited in claim 15.

The Examiner admits that US '707 and US '654 do not teach methods for coating aluminate phosphors.

Applicants submit that US '707 does not teach coating methods employing aluminate phosphors and therefore does not teach mixing an aluminate phosphor with a coupling agent comprising an aluminum compound as in present claim 15.

US' 654 does not teach coating methods employing aluminate phosphors and therefore does not teach mixing an aluminate phosphor with a coupling agent comprising an aluminum compound as in present claim 15. Further, US '654 is non-analogous art. US '654 is directed to a superconductive material and is in a different technical field from US '707. Thus, one of ordinary skill in the art would not have been motivated to combine the references as suggested by the Examiner.

US '047 teaches coating aluminate phosphors, but does not suggest the use of a coupling agent comprising an aluminum compound as the coating precursor as recited in claim 15. As previously discussed, US '047 teaches away from the use of coatings that react with the phosphor substrate. The object of US '047 is to provide a coating which is not subject to degeneration when the phosphor is excited by UV-radiation. Column 1, lines 35-37. This object is achieved by using anhydrous catena-polyphosphates which form a hard water insoluble coating on the phosphor particles and do not react with the UV-phosphors such that even when the catena-polyphosphates are exposed to radiation, they do not degrade like the aluminate phosphors. Column 1, lines 44-60. Therefore, US '047 teaches away from a coupling agent that

would react with an aluminate phosphor as in the present invention. On the other hand, US '707 is concerned with manganese activated zinc silicate phosphor (see column 1, lines 20-21) and not an aluminate phosphor. Therefore, it follows that, based on the teachings of the references, one of ordinary skill in the art would not have been motivated to modify or combine US '047 with US '707 (US '654 is considered as non-analogous art as discussed above) and to employ a coupling agent comprising an aluminum compound as an aluminum oxide precursor to form an aluminum oxide coating on an aluminate phosphor, as provided for in present claim 15. Thus, the Examiner has not established a prima facie showing obviousness with respect to the claimed invention.

In the Examiner's answer, the Examiner maintains the position that Applicants' argument that the anhydrous catena-polyphosphate coating materials of US '047 do not react with the UV phosphors is not convincing because US '047 does not contain a statement of inoperability necessary to rise to the level of "teaching away" from the claimed invention and because the present claims do not require a reaction with the substrate.

Again, Appellants respectfully disagree with the Examiner's statement indicating that there must be a statement of inoperability in the reference in order for the reference to be considered as teaching away from the claimed invention. This is not the law. The test for obviousness is what the combined teachings of the references would have suggested to those of ordinary skill in the art and the proper inquiry is whether the prior art as a whole suggests the desirability of the claimed invention. See MPEP § 2143.01(1) and (II). A disclosure which criticizes, discredits, or otherwise discourages the claimed invention may be a sufficient teaching

away to establish nonobviousness of a claimed invention. See MPEP § 2143.02(VI) quoting *In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed.Cir. 2004).

In applying these legal principles, Appellants submit that the Examiner has not met the initial burden of providing some suggestion of the desirability of combining or modifying the teachings in the prior art to arrive at the claimed invention. As the Examiner admits, US '707 does not teach or suggest the use of aluminate phosphors and US '047 does not teach or suggest aluminum oxide coatings (US '654 is considered as non-analogous art for the reasons set forth above). Further, as discussed above, there is no suggestion of the desirability in the prior art of employing a coupling agent comprising an aluminum compound to coat aluminate phosphors. The simple fact that US '047 teaches that aluminate phosphors benefit from coatings that increase their lifetime does not mean that one of ordinary skill in the art would have selected the coating material of US '707 which is taught to improve maintenance of manganese activated zinc silicate phosphors.

The Examiner is saying, in effect, that it is obvious to try various phosphors in the process of US '707 or to try various coatings for the aluminate phosphors of US '047 so as to determine optimum conditions. However, Appellants respectfully submit that the applicable law is to the contrary. The law states that it is not a valid basis for rejecting a claim under 35 U.S.C. § 103(a) that it was obvious to try variations to find optimum conditions. See, e.g., *In re Sigco*, 1995 U.S. App. LEXIS 3053, 36 USPQ2d 1380, 1382 (Fed. Cir. 1995) (citing *In re Dow Chem. Co.*, 837 F.2d 469, 473, 5 USPQ2d 1521, 1532 (Fed. Cir. 1988) (rejecting the "obvious to try"

standard)); *In re Deuel*, 51 F.3d 1552, 34 USPQ2d 1210, 1216 (Fed. Cir. 1995) (“‘obvious to try’ has long been held not to constitute obviousness”).

In view of the above, one of ordinary skill in the art would not have been motivated to combine the references with a reasonable expectation of success in achieving a coated aluminate phosphor as in the present invention. Even further, since none of US ‘707, US ‘654 and US ‘047 teaches or suggests mixing an aluminate phosphor with a coupling agent to react with the phosphor substrate, the present invention would not have been achieved even if the references were combined. US ‘707 teaches that the aluminum ions are adsorbed on the surface of the manganese activated zinc silicate, US ‘654 teaches a superconductive material including a substrate and a superconductive layer of a double oxide of metals provided on the surface of the substrate and is not related to the present invention, and US ‘047 teaches that the catenapolyphosphates of the coating do not react with the UV-phosphors as discussed above. Thus, one of ordinary skill in the art would not have been motivated to combine the disclosures of US ‘707, US ‘654 and US ‘047 with a reasonable expectation of success in achieving the claimed invention since neither reference teaches mixing an aluminate phosphor with a coupling agent comprising an aluminum compound as recited in claim 15.

Accordingly, the obviousness rejection as to claim 15 should be reversed.

**(b) Claims 1, 3 and 4**

For the reasons set forth above, which are incorporated herein, Appellants maintain that US ‘707, US ‘654 and US ‘047, taken alone or in combination, do not even teach or suggest


mixing an aluminate phosphor with a coupling agent comprising an aluminum compound. Since the cited references do not even teach mixing an aluminate phosphor with a coupling agent comprising an aluminum compound, the references cannot be said to teach or suggest mixing an aluminate phosphor with the specific coupling agent comprising an aluminum compound with a 1,3-diketone structure as in present claim 1. Claims 3 and 4 depend from claim 1 and is patentable for at least the same reasons.

Accordingly, the rejection as to claims 1, 3 and 4 should be reversed.

### CONCLUSION

For the above reasons as well as the reasons set forth in the Appeal Brief, Appellant respectfully requests that the Board reverse the Examiner's rejections of all claims on Appeal. An early and favorable decision on the merits of this Appeal is respectfully requested.

Respectfully submitted,

  
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